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ABSTRACT

This study attempts to identify factors that may contribute to the learning process of the student pilot in order to lower flight costs while maintaining or increasing safety factors. Specifically, it tests the hypothesis that a significant relationship exists between the similarity of flight instructor and student pilot perceptive styles and the performance of the student pilot. If such a relationship exists, students and instructors can be matched, thus saving time necessary to obtain a private pilot's license. The sample population used in this study was 32 college students (22 males and 10 females) from the University of North Dakota in 1982. Subjects' personality differences were measured with form F of the Myers-Briggs Type Indicator (MBTI). The test contained indexes for determining each of four basic preferences: extrovert-introvert, sensing-intuitive, thinking-feeling, and judging-perceiving. The study found that only the extrovert-introvert differences between male student pilots and their flight instructors compared with student pilot flight training time were statistically significant. This result suggests that if male student pilots are paired with their instructors on the proximity of their scores on the extrovert-introvert scale of the MBTI, student pilots can be trained in less time. (The study was limited by small sample size and the absence of controls for intervening variables.) (KC)

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FLIGHT INSTRUCTOR-STUDENT PILOT PERCEPTIVE
SIMILARITY AND ITS EFFECT ON FLIGHT TRAINING TIME

by

Ronald A. Kreienkamp

Bachelor of Science, University of North Dakota

An Independent Study

Submitted to the Graduate Faculty

of the

University of North Dakota

in partial fulfillment of the requirements

for the degree of

Master of Arts

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This independent study submitted by Ronald A. Kreienkamp in partial fulfillment of the requirements for the Degree of Masters of Arts from the University of North Dakota is hereby approved by the Faculty Advisor under whom the work has been done.

Thomas B. Scott
(Advisor)

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CHAPTER I

INTRODUCTION

Background of the Problem

In the almost eighty years of powered flight, man has been struggling with the difficult, sometimes dangerous, and always expensive process of acquiring the necessary skills to pilot an aircraft safely through the sky. To put out a safer and better trained "product", pilot training has improved dramatically since the prelicensing days of the "barnstormers."

Today student pilots go through a well-organized, carefully packaged curriculum taught by certified flight instructors who themselves are the end result of many courses of flight instruction. The efficiency of this flight training curriculum has been refined to such a degree that the Federal Aviation Administration (FAA) has ruled that a student pilot may be granted a private pilot's license and the privilege of carrying passengers with as few as 35 hours of flight time, only 20 of which must be under the direct in-cockpit supervision of the flight instructor (FAA, 1982). That figure is seldom attained.

Training records from a sample of 100 student pilots in the Aviation Department of the University of North Dakota showed that the average flight time to obtain a private pilot's license was approximately 50 hours. The range of flight time was from 40 hours on the low end to 91 hours on the other. Because of the oil embargo of 1974 and the corresponding rise in fuel prices, the cost of obtaining a pilot's license has more than doubled

in the last ten years. Current costs for the prospective pilot would be approximately \$2500 to obtain this license. In the interest of safer, more efficient educational techniques, and, in an attempt to retard the increasing cost of attaining a pilot's license, refinement of the teaching-learning process would appear to be a desirable goal.

Statement of the Problem

Even with a carefully structured learning environment, standardized curriculums, and flight instructors who had received their training under similar conditions, there appears to be other factors influencing the wide range of flight training hours necessary to obtain a pilot's license. Flight instructors have noted student-instructor relationships where a learning plateau was reached, including times when a student and his instructor did not get along from the very start, when a change of instructor was necessary for the completion of training.

Flight instructors are taught that, from the first meeting with their students, they are to carefully analyze the personality, thinking, and ability of each student. The ability to analyze a student correctly and apply instruction in the manner in which the student is most receptive is essential to good instruction (FAA, 1977). A knowledge of student perceptive style, acquired through individual testing, may help flight instructors find the best way to motivate a student or correct weaknesses. Information of this type might help an instructor to better understand and relate to their students in the training environment. If any human relations problems exist, the learning process will be inhibited. This study will question whether or not the difference in perceptive style between student and instructor at least partially accounts for the wide range of flying hours required to obtain a pilot's license.

Hypothesis

The following hypothesis will be tested in this study: There is a significant relationship between perceptive style similarity of student pilots and their flight instructors, and student pilot performance, as reflected by time in flight training.

Limitations

This study is limited by the size of the population sample and the limited generalizability afforded by such a small number of subjects. Of the 100 subjects in the research population, only 33 completed all requirements for this study. Subjects were eliminated because they failed to complete the private pilot curriculum (N=23) and because either they or their flight instructor failed to complete a personality assessment device used in this study (N=44).

Definition of Terms

Perceptive Similarity - The degree to which a student and his or her flight instructor are similar in the process of becoming aware as measured by the Myers-Briggs Type Indicator.

FAA - Federal Aviation Administration, the government agency that provides and enforces regulations concerning aircraft and their operation.

Flight Curriculum - The lesson plan or learning process involved in teaching students to fly aircraft.

Flight Instructor - An individual certified by the FAA to teach persons to fly an aircraft.

Student Pilot - An individual who is learning to fly an aircraft.

Phase 27 - The point in time in the flying curriculum when the student pilot has satisfactorily completed all course requirements and is eligible to take the FAA final examination flight for a private pilot's license.

CHAPTER II

LITERATURE REVIEW

Effective, efficient supervision and training is necessary in the flying environment particularly because lives depend upon the flight instructor's ability to effectively teach the student the myriad of things they are required to know to safely operate an aircraft. In addition to basic and advanced flying skills used in everyday flight operations, the student must learn to deal with a multitude of emergency conditions quickly and decisively should they occur.

Not much literature exists on the student pilot-flight instructor teaching relationship. It was necessary to pursue comparative research in similar areas which included relationships between supervisors and trainees, counselors and clients, and students and instructors.

Supervision and Counseling Relationships

The interpersonal relationship that exists between supervisors and their trainees has been said to be the most important element in effective supervision. Arbuckle (1963) questioned the more traditional content concept of learning and pointed out teachers are more concerned with product and ideas rather than with process and people. Bockneck (1971) emphasized the need for practical implementation, cognitive insight not being enough. He stated that a supervisor must begin with an attitude of respect for the trainee as a person, sensitive to his feelings and needs.

Supervision has been shown to have many parallels to the therapeutic relationship that develops between client and counselor (Lambert, 1974). In a study comparing the process of supervision with that of counseling, by examining the behavior of five professional therapists in both situations, results indicated that the level of respect and genuineness were equal in the two situations. Contrary to the assumptions made by the researchers in this area, the levels of empathy and specificity were significantly lower in supervision than in counseling.

Existence of relationships between personality and style of verbal interaction have been found demonstrating significance in an individual's conceptual system and teaching style. Hunt and Joyce (1967) conducted a study of the relationship between the personality of teacher trainees and their initial pattern or style of teaching. Their results supported the hypothesized relationship between personality and teaching pattern.

Carr (1970) found positive results investigating the counselor-client relationship in a study of fourth-year medical students who were serving a 12-week psychiatric outpatient clerkship. He noted that cognitive similarity may be defined not only in terms of similarity in the concepts used in conceptualization but also in terms of similarity in the degree to which their conceptual dimensions are differentiated. Patients and therapists were given the Interpersonal Discrimination Test (IDT) which provided a measure of differentiation based upon the number of interpersonal discriminations made among a number of stimulus persons along the subject's own conceptual dimensions. Differentiation compatibility occurred when the patient's discriminatory ability was similar to his or her therapist.

Carr noted that differentiation compatibility of patient and therapist is essential to improved outcome as perceived by the patient and as evidenced by his or her reported symptom reduction. Patients whose differentiation

scores were close to those of their therapists on the IDT showed more improvement than clients whose initial differentiation scores were discrepant from their therapists.

Wilkowitz, Cohen, and Ortmeyer (1967) found a similar positive relationship between success in counseling and similarity. A study of 38 psychotherapists and 44 patients at two New York City psychoanalytic training institutes indicated that therapists and their own patients were closer in values than those randomly paired and those patients rated as "most improved" by their therapists were closer to their therapists in values than patients rated "least improved."

Other studies, however, have suggested the possibility that differing construct styles or construct dissimilarity may enhance the therapeutic relationship between counselors and clients. Mendelsohn and Geller (1963) tested 72 clients and their counselors at the University of California, Berkley, using the MBTI. An absolute difference score was obtained for each client-counselor pair and correlated with the number of counseling sessions. The results indicated that the greater over-all similarity, the greater the length of counseling. Bare (1967) studied 47 counselors in graduate training at UCLA over a two year period and found that clients and counselors agreed that counseling success is achieved best when counselors are unlike their clients on such variables as original thinking, vigor and responsibility. In a Boston University study of 24 student counselors and their supervisors, matching supervisors and student counselors according to their personality factor profiles was found to be of questionable value in terms of enhancing either the supervisory relationship or the student's effectiveness. However, the findings did indicate that how the student perceives his relationship with his supervisor is related to his self-evaluation of effectiveness (Bippo, 1974).

Myers-Briggs Type Indicator

The Myers-Briggs Type Indicator has been used extensively in cognitive research. The Indicator aims to ascertain people's basic preferences in regard to perception and judgment (Myers, 1962). In one study it was shown that when 72 clients and their counselors were administered the MBTI it showed a significant relationship between client-counselor similarity and length of counseling (Mendelsohn & Geller, 1963).

Research at the University of Florida indicated that there is a correlation between a student's score on the MBTI and his preference for college teaching methods. Also the individualization of instruction with a variety of learning experiences is a desirable teaching strategy for college teachers (Smith, 1973).

Summary

Whatever a particular individual's perceptive style may be, other individuals with the same or similar style should be easier to understand and communicate with. On the other hand, individuals with different perceptive styles may be more difficult to communicate with, less predictable, and contrary on most personal opinions.

With these personality matching scenarios in mind, a portion of the substantial differences in flying hours needed to pass the private pilot license examination may possibly be attributable to differing perceptive styles. If this were to prove correct, the flight curriculum efficiency might be improved significantly. In flight training schools prospective pilots could take an examination that would more effectively match them with their flight instructors and expect satisfactory completion of the flying curriculum in less time on the average than if they were assigned an

instructor at random. Perceptive style similarity appears to have an overall potentially significant effect on the supervisory and/or learning relationship.

CHAPTER III

METHODOLOGY

Subjects

Subjects for this study were 33 college students at the University of North Dakota who were tested in 1982. The original population consisted of 100 students, but those who failed to complete the private pilot curriculum (N=23) were eliminated. The population size was further reduced by the elimination of either students who did not complete the Myers-Briggs Type Indicator or flight instructors who failed to complete the test (N=44).

One other test score was eliminated because of its position within the sample. Thirty-two of the 33 scores fell between -1.25 and +1.79 standard deviations of the mean. The other score was +3.37 standard deviations above the mean, and not representative of the sample population; it was eliminated. Of the remaining 32 subjects, 22 were male, 10 were female.

Instrument

Myers-Briggs Type Indicator (MBTI). This instrument was chosen to determine, from self-report of easily reported reactions, individuals' basic preferences in regard to perception and judgment. It has been shown to be an effective measurement tool for this purpose. Form F was utilized consisting of 166 items. All necessary instructions were located on the cover page of the test booklet. There was no time limit.

The MBTI is useful for this study because it does not carry positive or negative connotations, rather, what the subject as an individual likes or dislikes. Subjects are classified in positive terms, by what they like, not what they lack. As the test cannot be "failed", the intent is to remove any pressure to perform or conform to expectations.

This instrument contains separate indices for determining each of the four basic preferences which structure the individual's personality based on Jung's theory of type (Hall & Nordby, 1973). Basic preferences about perception and judgement tend to affect people's interests, values and needs and consequently their motivations (Myers, 1962).

The E-I index was designed to reflect the degree of extraversion or introversion in a subject. The extravert is outward centered and tends to focus his perception and judgement on people and things. The introvert is inwardly oriented and tends to focus his perception and judgement upon concepts and ideas.

The S-N index was designed to reflect the differences in one's ability to perceive, relying primarily on sensing (made aware of things directly through any number of the five senses) or by the process of intuition (or indirect perception by way of the unconscious).

The T-F index was designed to reflect a subject's preference about judging, whether they rely primarily on thinking (impersonally discriminating between true and false), or primarily on feeling (discriminating between valued and not-valued).

The J-P index was designed to reflect whether a person relied on a judging process (T or F) or upon a perceptive process (S or N) in dealing with the outer world or extraverted part of their lives (Myers, 1962).

These indices are designed to point one way or another; on each index scores run in either direction with zero at the center. The range of score possibilities for each scale is:

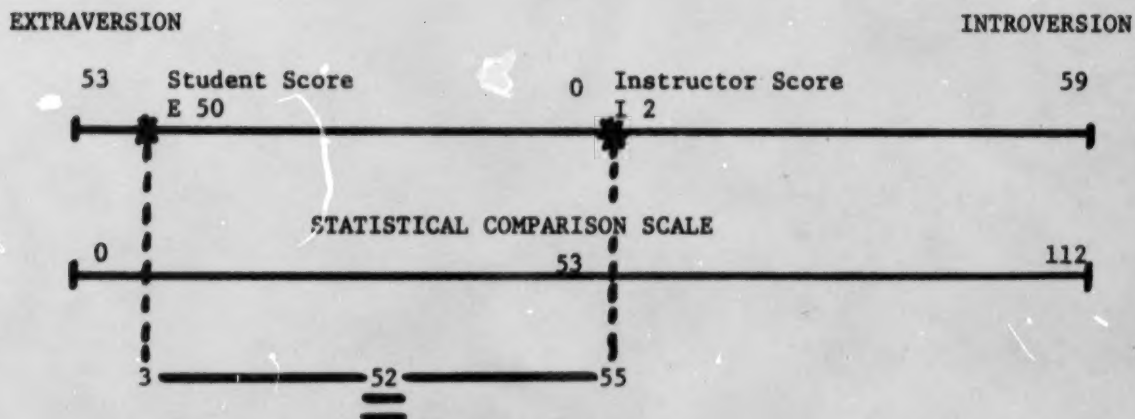
E 53	0	T 59
S 67	0	N 51
T 49	0	F 51 (males)
T 61	0	F 49 (females)
J 55	0	P 61

For statistical purposes of this study, these scores were converted to scales ranging from 0-120. The student's score on each scale was compared with the instructor's score on that scale and the difference between them constituted the independent variable. For example, a student with an extravert-introvert scale score of E 50 and a flight instructor score on the same E-I scale of I 2 would statistically translate to scores of 3 and 55 respectively. The difference between these two scores, 52, constituted the independent variable. The difference scores on each scale of the MBTI were then correlated with student pilot time in training (phase 27 time). Figure 1 below represents the score conversion process.

FIGURE 1

MBTI-STATISTICAL SCORE

CONVERSION CHART



Split-half reliabilities on the MBTI were obtained by applying the Spearman-Brown formula. With an N of 100 male and 100 female college students, the following split-half reliability figures for the indices were obtained:

	EI	SN	TF	JP
Males	.81	.87	.86	.80
Females	.82	.87	.83	.84

A limitation for potential test subjects is that normative samples with above average intelligence were desired for these analyses because they promised a higher level of reading comprehension. When the Indicator is used with poor readers, scores should be interpreted with caution. The population for this study was college students, thus that limitation was not cause for concern.

Validity information was obtained by comparing the MBTI with the Gray-Wheelwright Psychological Type Questionnaire which has the same purpose as the MBTI, to identify the Jungian types. Correlations of E-I, S-N and T-F with the corresponding Gray-Wheelwright scales are .79, .58, and .60 respectively; there is no J-P scale on the latter test. The MBTI manual notes that "in-so-far as the type preferences are found to correlate, in appropriate directions, with interests, values and needs ascertained by other tests, or to correlate approximately with any other external evidence of internal differences, support is afforded for the validity of the theory and the Indicator (Myers, 1962, p. 21)".

Variables

Five variables were utilized in this study; E-I, S-N, T-F and J-P difference scores between student pilots and their flight instructors, and the number of hours required to complete requirements for a private pilot's

license. This study was designed to examine the potential relationship of student-instructor personality differences to student pilot performance. For example, a low extravert-introvert student-instructor score difference should indicate that the student will acquire a private pilot's license in fewer hours than if the score difference were greater.

Statistical Test

The student-instructor personality difference scores were the interval-level independent variables. The student pilot performance score was the ratio-level dependent variable. Although the MBTI does not have separate sex norms, it seems advisable to analyze the results by sex. Consequently, Pearson product moment correlations for each sex were used to examine the strength of the relationship between the dependent and each of the four independent variables.

CHAPTER IV

ANALYSIS OF THE DATA

To test the hypothesis that a relationship exists between the perceptive styles of students and their flight instructors, and student pilot flight performance, Pearson correlations were computed. Thirty-two subjects were used in this study, 22 males and 10 females. Their MBTI scores (by scale) and phase 27 times, separated by sex, appear in Table 1 below.

TABLE 1
MBTI SCORES & PHASE 27 TIMES

	Male		Female	
	Mean	S.D.	Mean	S.D.
E-I Scale	53.1	19.4	47.2	23.7
S-N Scale	47.5	22.7	54.6	22.1
T-F Scale	55.2	17.7	59.2	14.6
J-P Scale	68.5	23.6	61.6	26.9
Phase 27 time	48.9	6.4	53.8	5.8

Combined phase 27 times ranged between 41.1 and 65.7 hours or -1.42 to +2.34 standard deviations from the mean (N=32).

MBTI difference scores between students and their flight instructors are shown in Table 2 below with the Pearson correlations derived by comparing the phase 27 times with each of the difference scores.

TABLE 2

MBTI DIFFERENCE SCORES AND CORRELATIONS
BY SEX BETWEEN SCORES AND FLIGHT
TRAINING TIME

	Males		
	Mean	S.D.	Correlation
E-I Difference	22.4	15.1	.37*
S-N Difference	23.6	17.7	-.06
T-F Difference	22.9	16.8	-.10
J-P Difference	35.0	19.2	.07

	Females		
	Mean	S.D.	Correlation
E-I Difference	29.3	17.4	.06
S-N Difference	27.4	18.7	.49
T-F Difference	20.7	12.1	-.07
J-P Difference	23.8	23.7	-.22

(* p < .05)

The Pearson correlation for males on the Extravert-Introvert scale was significant as shown above ($p=.047$). This indicates that on the Extravert-Introvert scale a lower difference score should result in a lower phase 27 time. The Pearson correlation for females on the Sensing-Intuitive scale was quite high (.49), but it was not significant ($p=.08$) as a result of small sample size.

CHAPTER V

SUMMARY, DISCUSSION AND RECOMMENDATIONS

Summary

Flight training is one of a relatively few forms of education in which the merits of teaching style and efficiency must be weighed against the survivability of the student, both physically and financially. The purpose of this study was to identify factors which may contribute to the learning process of the student pilot and lower flight costs while maintaining or increasing the safety factor in the learning environment. It was hypothesized that a significant relationship exists between the similarity of flight instructor and student pilot perceptive styles and the performance of the student pilot. A significant relationship would allow prospective student pilots and flight instructors to be matched in a more efficient manner than if done randomly. The time required to acquire the skills necessary to obtain a private pilot's license could be reduced, saving the student money while maintaining an adequate safety margin. The sample used in this study consisted of 32 college students (22 males, 10 females) from the Department of Aviation, University of North Dakota in 1982.

The instrument used to measure the subjects' personality differences was form F of the Myers-Briggs Type Indicator (MBTI). It was chosen for its ability to measure likes and dislikes rather than positive or negative connotations. The test contained separate indices for determining each of the four basic preferences which structure the individual's personality, based on Jung's theory of type. These preferences are:

1. Extravert-Introvert
2. Sensing-Intuitive
3. Thinking-Feeling
4. Judging-Perceiving

On each index scores ran in both directions with zero at the center. For statistical purposes the scores were converted to a scale ranging between 0-120. The student's score on each scale was compared with the flight instructor's score on that scale and the difference between them constituted the independent variable. The difference scores on each scale of the MBTI were then correlated with student pilot flight training time (the dependent variable) using a Pearson correlation.

The major conclusions of this study were:

1) The extravert-introvert differences between male student pilots and their flight instructors compared with student pilot flight training time was statistically significant. Differences on the sensing-intuitive, thinking-feeling, and judging-perceiving scales were not statistically significant. This result suggests that if male student pilots are paired with their prospective flight instructors based on the proximity of their scores on the Extravert-Introvert scale of the MBTI, the student pilots can expect lower phase 27 times than if they were not matched. These results are similar to those noted by Carr (1970) and Wilkowitz, Cohen, and Ortmeyer (1967).

2) On the basis of sex, male's extravert-introvert difference scores were statistically significant while female's scores were not. All other difference scores for males and females were not significant. However, the female difference score on the sensing-intuitive scale was in the expected direction (Pearson correlation = .49, $p=.077$).

Discussion and Recommendations

This study was delimited to college students at the University of North Dakota, Grand Forks, during 1982. It was limited by the small sample size. The size of the population used in this study seriously restricts the generalizability of the results. The study was further limited by the unavailability of MBTI scores, primarily from flight instructors. These additional scores would have increased the population size significantly since one flight instructor may teach as many as eight student pilots. As it was, only one student-instructor relationship in three provided complete data.

The results of this study present some support for the assertion that personality type and perceptive style are influential in the acquisition of flying skills. It is, however, quite possible that any number of mediating variables, not controlled for in this study, may have been operating. These mediating variables, which may interact simultaneously include scholastic stress, social environment, self-concept, parental and/or peer support, student-instructor amicability, interrupted flying curriculum due to bad weather conditions or finances. Current literature supports assertions that some of these factors are related to the learning process.

More research with larger population samples is needed before any steadfast conclusions can be drawn. It appears quite likely that perceptive style matching will affect performance. Because of the limitations of this study resulting from a small population examined, a follow-up study using a much larger sample would appear worthwhile.

As there appears to be significant differences in the meaningful elements of perception between males and females, correlations based on sex may be helpful in providing a clearer picture of levels of significance.

Finally, future studies could control for the possible mediating variables described above, thus reducing the likelihood of distortions due to external factors.

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